



CONGRESSIONAL BUDGET OFFICE
U.S. Congress
Washington, DC 20515

Dan L. Crippen, Director

September 24, 2002

Honorable Joseph R. Biden Jr.
Chairman
Committee on Foreign Relations
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

As you requested, the Congressional Budget Office has prepared the attached estimate of the budgetary impact from implementing The Treaty Between the United States of America and the Russian Federation on Strategic Offensive Reductions, signed at the Moscow Summit on May 24, 2002. Under that treaty, the United States and Russia would reduce their number of strategic nuclear warheads to between 1,700 and 2,200, about two-thirds below current levels, by December 31, 2012.

If you wish further details on this estimate, we would be pleased to provide them. The CBO staff contacts are Raymond J. Hall (in the Budget Analysis Division), who can be reached at 226-2840, and J. Michael Gilmore (in the National Security Division), who can be reached at 226-2900.

Sincerely,

A handwritten signature in blue ink that reads "Dan L. Crippen".

Dan L. Crippen

Attachment

cc: Honorable Jesse Helms
Ranking Minority Member

Attachment

**Estimated Costs and Savings
from Implementing the Moscow Treaty**

Congressional Budget Office

September 2002

SUMMARY

The Strategic Arms Reduction Treaty (START) limits the United States and the former countries of the Soviet Union (Russia, Belarus, Kazakhstan, and Ukraine) to 6,000 accountable warheads. The Treaty Between the United States of America and the Russian Federation on Strategic Offensive Reductions (informally known as the “Moscow Treaty”) calls for both countries to reduce that number of warheads to between 1,700 and 2,200 by 2012. The Administration first announced its intention to pursue those reductions at the conclusion of the Nuclear Posture Review (NPR) in January 2002. That review also set an interim goal of reducing the number of warheads available for immediate use to approximately 3,800 by 2007.

To meet the interim goal set by the NPR, the Administration would need to remove about 2,100 warheads from U.S. strategic offensive forces. The Administration’s fiscal year 2003-2007 defense plan would partially achieve that goal by retiring all 50 Peacekeeper missiles, removing four Trident submarines from strategic service and converting them to a conventional (non-nuclear) role, and permanently converting all 81 B-1 bombers to a conventional role. In total, about 1,100 warheads would be removed by implementing that plan. To fully attain the NPR goal, however, the Department of Defense (DoD) would need to remove about 1,000 more warheads from delivery platforms. The Congressional Budget Office (CBO) estimates that the costs to remove those additional warheads would amount to roughly \$25 million over the 2003-2007 period and \$55 million over the 2003-2012 period. (Costs and savings provided in this estimate are expressed relative to the costs of operating strategic offensive nuclear forces and supporting activities under the Administration’s fiscal year 2003-2007 defense plan. All cost estimates are in current dollars of budget authority.)

Achieving the Moscow Treaty goal of having no more than 1,700 to 2,200 warheads available for immediate use by 2012 would require the Administration to remove a total of 2,600 to 3,100 warheads from service. Those reductions could be achieved in many ways. In the absence of definitive plans from the Administration, CBO has examined two paths for achieving those reductions. The first path would keep most of the delivery platforms that were planned to be in place in 2007, whereas the second path would remove or retire some missiles and submarines. Implementing the first path would cost about \$25 million over the 2003-2007 period and about \$105 million over the 2003-2012 period, CBO estimates, if the United States reduced warheads to the 2,200 level (see Summary Table 1). Removing or retiring delivery platforms, in contrast, offers the potential for significant savings. CBO estimates that the second path would save about \$2.2 billion over the 2003-2007 period and \$5.1 billion through 2012. Reducing the number of available warheads to the lower level of 1,700 would not necessarily result in significant costs or savings beyond those estimated for the 2,200-warhead level, CBO estimates. Accelerating the warhead reductions to achieve the Moscow Treaty target by 2007 might necessitate some additional spending beyond that estimated for the paths mentioned above.

Summary Table 1.**Costs or Savings (-) of Two Paths to Achieve the Moscow Treaty's Warhead-Reduction Goal****(In millions of dollars)**

	Total, 2003-2007	Total, 2008-2012	Total, 2003-2012
<hr/>			
Reduce Warheads to Moscow Treaty Levels by 2012 Without Retiring Delivery Platforms	25	80	105
Reduce Warheads to Moscow Treaty Levels by 2012 by Retiring Some Delivery Platforms	-2,165	-2,920	-5,085

SOURCE: Congressional Budget Office.

NOTE: Costs and savings shown in this table are associated with approaches to reduce the number of warheads to the Moscow Treaty goal of 2,200. Reducing the number of warheads to 1,700 would not necessarily result in significant additional costs or savings.

CBO also investigated the possible budgetary impact of dismantling, instead of storing, weapons removed from service. Because warheads stored in a status preventing their immediate use by strategic forces would not count against the Moscow Treaty's numerical limitations, no warheads would need to be destroyed. Dismantling one-half or more of the warheads removed to meet Moscow Treaty requirements could have substantial costs, depending on when the efforts might be scheduled. According to information provided by the National Nuclear Security Administration (NNSA) of the Department of Energy, dismantling one-half of the warheads by 2012 would exceed the planned capacity at its Pantex nuclear weapons production facility in Amarillo, Texas. If completion of dismantlement could be delayed until the 2020-2025 period, the planned capacity at Pantex would probably be sufficient.

CBO currently has insufficient information to estimate the effects that dismantling (instead of storing and maintaining) warheads might have on needed tritium and pit production capacities.¹ But because the NNSA's current plans are based on maintaining an inventory consistent with levels under START, dismantling a significant fraction of that inventory ought to imply a concomitant reduction in needed steady-state tritium and pit production capacities.

1. A modern thermonuclear weapon consists of a primary and a secondary. The primary uses fission (the splitting of atoms) to create enough energy to start a fusion reaction in the secondary. The pit is a key component of the primary and is composed of fissionable material such as plutonium.

CBO also examined issues relating to treaty verification. According to statements made by the Administration, the Moscow Treaty contains no additional verification provisions beyond those implemented for START. Other supplementary measures, including transparency measures, could be agreed to in the future, but CBO has no basis for predicting the nature or cost of such additional measures.

As part of this cost estimate, CBO also looked at the costs of converting strategic bombers and submarines to conventional missions while maintaining a ready capability to revert to a strategic role. The Administration has announced no plans for converting bombers and submarines to a conventional-only configuration while retaining the option to restore their nuclear capability. The details of such plans would be key in determining the costs for initial conversion as well as those to restore nuclear capability. Without that information, CBO has no basis for definitively estimating those costs, which could be either negligible or significant depending on the approach taken.

Lastly, CBO examined the possible savings from lowering the operational status of, or taking off high alert, strategic forces scheduled for retirement. The Administration has announced no plans to retire any delivery platforms beyond the Peacekeeper missiles that would be retired by 2005. The savings associated with lowering the operational status of such forces would probably be small.

INTRODUCTION

For most of the past 40 years, the Department of Defense has maintained a triad of strategic offensive nuclear forces consisting of missiles, submarines, and bombers. Those forces have been subject to the Strategic Arms Reduction Treaty since it took effect on December 5, 1994. That treaty limits the United States and the former countries of the Soviet Union (Russia, Belarus, Kazakhstan, and Ukraine) to 6,000 accountable warheads following the seven-year reduction period that ended on December 4, 2001.

Under START, the size of U.S. strategic offensive nuclear forces declined significantly, from over 8,800 accountable warheads at the treaty's inception to fewer than 6,000 warheads today. The declared force structure consists of 1,200 warheads on 500 Minuteman III missiles, 500 warheads on 50 Peacekeeper missiles, about 3,200 warheads on C4 and D5 missiles carried on 18 Trident submarines, and roughly 1,000 nuclear bombs and cruise missiles deployed on nearly 200 strategic bombers (see Table 1).

Table 1.
Comparison of Various Strategic Offensive Forces
(In numbers of delivery platforms and deployed warheads)

Weapon	Strategic Forces Under START Counting Rules		Forces Planned for Deployment in 2007			
			The Administration's FY 2003-2007 Defense Plan		An Approach to Achieve the NPR Goal	
	Quantity	Warheads ^a	Quantity	Warheads ^b	Quantity	Warheads ^c
ICBMs						
Minuteman III	500	1,200	500	1,200	500	800
Peacekeeper	50	500	0	0	0	0
SLBMs						
Trident Submarines Carrying C4 Missiles	6	864	0	0	0	0
Trident Submarines Carrying D5 Missiles	12	2,304	14	2,304	14	1,656
Bombers						
B-1	81	81	d	0	d	0
B-2	21	21	21	256	21	256
B-52	94	<u>940</u>	76	<u>1,056</u>	76	<u>1,056</u>
Total		5,910		4,816		3,768

SOURCE: Congressional Budget Office based on data from the Department of Defense.

NOTE: FY = fiscal year; ICBM = intercontinental ballistic missile; NPR = Nuclear Posture Review; SLBM = submarine-launched ballistic missile; START = Strategic Arms Reduction Treaty.

- a. Under START, warheads are counted as follows: three warheads on each of 350 Minuteman missiles and one warhead on each of the remaining 150 Minuteman missiles; 10 warheads on each Peacekeeper missile; six warheads on each C4 missile and eight warheads on each D5 missile (each Trident submarine carries either 24 C4 missiles or 24 D5 missiles); one warhead on each B-1 and B-2 bomber and 10 warheads on each B-52 bomber.
- b. Under the Administration's plan, warheads are counted as follows: three warheads on each of 350 Minuteman missiles and one warhead on each of the remaining 150 Minuteman missiles; eight warheads on each D5 missile (for a total of 192 warheads on each of the 12 operationally deployed Trident submarines); 16 nuclear bombs on each of the 16 operationally deployed B-2 bombers; and from 12 to 20 cruise missiles on each of the 56 operationally deployed B-52 bombers.
- c. Under this approach, warheads are counted as follows: three warheads on each of 150 Minuteman missiles and a single warhead on each of the remaining 350 Minuteman missiles; either five or six warheads on each D5 missile (for a total of 138 warheads on each of the 12 operationally deployed Trident submarines); 16 nuclear bombs on each of the operationally deployed 16 B-2 bombers; and 12 to 20 cruise missiles on each of the 56 operationally deployed B-52 bombers.
- d. All B-1 bombers would be permanently converted to a conventional role.

The total number of accountable warheads on ballistic missiles is determined by the number of missiles, submarines, and bombers as well as the number of warheads declared on each of them. The original declarations were announced during the December 1987 Washington Summit between Presidents Reagan and Gorbachev. Since that time, the number of warheads on two missiles (the C4 and the Minuteman III) has been lowered; warhead counts on the other strategic platforms remain unchanged. Currently, the older C4 ballistic missile is declared to carry six warheads, and the newer D5 missile has eight warheads. The land-based Minuteman III ballistic missile currently has one or three warheads, depending on the Air Force base at which it is deployed, while the Peacekeeper missile carries 10 warheads. Under the provisions of START, warheads on strategic bombers are counted in one of two ways. Strategic bombers that are declared to carry long-range air-launched cruise missiles (the B-52s) count as 10 warheads each. Strategic bombers that are declared to not carry cruise missiles (the B-1s and B-2s) count as one warhead each.

The Administration's 2003-2007 Defense Plan

The Administration's fiscal year 2003-2007 defense plan would reduce the number of nuclear warheads, compared with today's levels, immediately available to U.S. strategic forces. The plan would lower the warhead count to about 4,800 by 2007 (see Table 1). The intent to pursue those reductions was first announced at the conclusion of the Nuclear Posture Review in January 2002. That review concluded that strategic forces equipped with between 1,700 and 2,200 warheads would be sufficient to maintain the security of the United States. The review also set an interim goal of reducing the number of nuclear warheads to approximately 3,800 by 2007. According to information provided by DoD, the fiscal year 2003-2007 defense plan would partially achieve that interim goal through:

- The retirement of all Peacekeeper missiles,
- The conversion of the four oldest Trident submarines to a conventional role, and
- The elimination of the capability to return the B-1 bombers to a nuclear role.

The Moscow Treaty

President George W. Bush and President Vladimir Putin signed the Moscow Treaty on May 24, 2002. That treaty, which is consistent with the results of the NPR, calls for both countries, by 2012, to maintain no more than 1,700 to 2,200 warheads in a status such that they are capable of immediate use by strategic offensive forces. (DoD and the National Nuclear Security Administration refer to warheads in that status as "operationally deployed warheads.") Under the terms of the treaty, each country would determine the numbers and types of bombers, submarines, and missile launchers that would constitute its strategic

offensive forces and determine the number of warheads on each type of delivery platform. Warheads stored in a status preventing their immediate use by strategic forces would not count toward the treaty's numerical limits. Thus, there is no requirement for any warheads to be destroyed under the terms of the Moscow Treaty. That treaty would also use the verification procedures of START to provide confidence and transparency in warhead reductions.

THE BUDGETARY IMPACT OF IMPLEMENTING THE MOSCOW TREATY

CBO has prepared estimates of the costs and savings that would result from reducing the U.S. arsenal of strategic weapons to comply with the Moscow Treaty. Specifically, CBO has estimated:

- The costs of reducing the U.S. arsenal to achieve the Administration's goal to deploy about 3,800 warheads by 2007, and
- The costs and savings of reducing the U.S. arsenal to achieve the Moscow Treaty's goal of between 1,700 and 2,200 warheads by 2012.

This paper also discusses the potential to accelerate the reductions in the number of warheads to achieve the Moscow Treaty's goal by 2007. CBO's estimates do not include any costs to build additional facilities to store the warheads and nuclear weapons that would be removed from delivery platforms because, according to DoD, the available storage capacity would be sufficient to accommodate all warheads removed from service.

Costs of Meeting the Administration's Goal of 3,800 Nuclear Warheads by 2007

Achieving the goal of having about 3,800 warheads available for immediate use by 2007 would require that the Administration reduce the U.S. nuclear arsenal below the levels set forth in its fiscal year 2003-2007 defense program. On the basis of information provided by DoD, CBO assumes that those reductions would be achieved by removing about 1,000 warheads from Minuteman and D5 missiles (see Table 1). The costs to remove those warheads would amount to about \$25 million over the 2003-2007 period and \$55 million over the 2003-2012 period, CBO estimates.

Remove Warheads from Minuteman Missiles. Today, the Air Force deploys 500 Minuteman III missiles at three bases: 150 missiles at F. E. Warren Air Force Base (AFB) in Wyoming, 200 missiles at Malmstrom AFB in Montana, and 150 missiles at Minot

AFB in North Dakota. Under START, the missiles at F. E. Warren AFB each carry a single warhead, whereas the missiles at the other two bases each carry three warheads, for a total of 1,200 warheads.

To reduce the number of warheads deployed on Minuteman missiles, the Air Force would convert an additional 200 missiles to a single-warhead configuration, CBO assumes. In all, 400 warheads would need to be removed and transported to storage facilities. According to the Air Force, it would need to replace the existing hardware on the missiles (primarily hardware called bulkheads that would be used to deploy the warheads on the missiles) with new hardware to accommodate the single warhead. It would need to augment squadron personnel with contractor support to accomplish that effort. The costs to remove the 400 warheads would total about \$15 million over the 2003-2007 period, CBO estimates—about \$10 million to replace the bulkheads and about \$5 million to place the warheads in shipping and storage containers and then transport them to storage facilities. The estimate does not include any costs to buy the new bulkheads because the Air Force has already purchased that hardware. Also, it does not include any costs to buy shipping and storage containers because the Air Force now has about 620 of those containers available for use and plans to purchase an additional 250 containers.

The Air Force has indicated that the number of personnel at the storage locations might need to be increased to support the maintenance activities associated with the storage of additional warheads, but it has not provided CBO with estimates of those staffing requirements. CBO believes that those costs would be negligible, however.

Remove Warheads from D5 Missiles. Today, the Navy deploys 432 C4 and D5 missiles containing roughly 3,200 warheads on 18 Trident submarines. Eight of those submarines are based at the Naval Submarine Base (NSB) in Bangor, Washington, and the other 10 are stationed at the NSB in Kings Bay, Georgia. The Navy plans to convert four of the Trident submarines to a conventional role. By 2007, under the Administration's plan, each of the remaining 14 Trident submarines would be equipped to carry 24 D5 missiles and—assuming that eight warheads were loaded on each D5 missile—could carry a total of 192 warheads. According to the Navy, an average of two submarines a year would undergo a major overhaul and thus would not carry any missiles. The 12 operationally deployed Trident submarines would carry a total of 2,304 warheads (see Table 1). The C4 missiles that would be removed from the submarines would be transported to a DoD facility for disposal. The warheads that would be removed from those missiles would either be reloaded onto the newer D5 missiles or stored at a DoD facility.

In order to achieve the NPR goal, CBO expects that the Navy would reduce the number of warheads on the D5 missiles. CBO assumes that the 12 operationally deployed submarines would each be equipped with 18 missiles loaded with six older warheads (these

older warheads are deployed on Mk4 reentry vehicles) and six missiles loaded with five newer warheads (these warheads are deployed on Mk5 reentry vehicles), for a total of 138 warheads on each vessel. In all, CBO estimates that 648 warheads would need to be removed from those vessels—54 warheads from each of the 12 Trident submarines. On the basis of information provided by the Navy, CBO estimates that removing the warheads from the missiles would not involve additional costs because that task would be accomplished by existing personnel as part of regular periodic maintenance. CBO also estimates that storing more warheads would not result in any significant additional costs. Finally, the estimate does not include any costs for modifying the existing missiles because, according to the Navy, the missiles can accommodate a load of five or six warheads without modifications.

As stated in the NPR, the Administration aims to retain the capability to reconstitute U.S. strategic forces with larger numbers of warheads than the Moscow Treaty permits. This means that the Navy must have the capability to take all of the Mk4 reentry vehicles that would be removed from the C4 and D5 missiles and placed in storage and reload them back onto the D5 missiles quickly. The hardware used to put the Mk4 reentry vehicles on D5 missiles is called a release assembly. The Navy has purchased sufficient quantities of Mk4 release assemblies to support the lower number of deployed warheads but not enough to support a higher level of reconstituted warheads. To provide this reconstitution capability, the Navy has indicated that roughly 600 Mk4 assemblies would need to be purchased over the 2004-2012 period. CBO estimates that the costs for those assemblies would total about \$40 million through 2012.

Costs and Savings from Meeting the Moscow Treaty's Goal of 1,700 to 2,200 Nuclear Warheads by 2012

Achieving the goal of having no more than 1,700 to 2,200 warheads available for immediate use by 2012 would require the Administration to remove another 1,600 to 2,100 warheads from service by that date. CBO has examined two paths for achieving those additional reductions. The first path (see Option 1, below) would keep all of the strategic delivery platforms that were planned to be in place in 2007—500 Minuteman missiles, 14 Trident submarines, 76 B-52 bombers, and 21 B-2 bombers. That path is consistent with the goals outlined by the Administration in the NPR. The second path (see Option 2, below) would remove or retire some warheads and delivery platforms: it retires 150 Minuteman missiles and two additional Trident submarines, and it converts the B-2 bombers to a conventional role, removing them from the arsenal of U.S. strategic offensive nuclear forces. Table 2 shows the delivery platforms associated with the Administration's plan and the two options.

Table 2.
Comparison of CBO's Options to Achieve the Moscow Treaty Goal of 2,200 Warheads by 2012
(In numbers of delivery platforms and deployed warheads)

Weapon	The Administration's FY 2003-2007 Defense Plan		Option 1: 2,200 Warheads, No Retirements ^a		Option 2: 2,200 Warheads, Fewer Platforms ^a	
	Quantity	Warheads ^b	Quantity	Warheads ^c	Quantity	Warheads ^d
ICBMs						
Minuteman III	500	1,200	500	500	350	650
Peacekeeper	0	0	0	0	0	0
SLBMs						
Trident Submarines Carrying C4 Missiles	0	0	0	0	0	0
Trident Submarines Carrying D5 Missiles	14	2,304	14	1,152	12	1,110
Bombers						
B-1	e	0	e	0	e	0
B-2	21	256	21	128	e	0
B-52	76	<u>1,056</u>	76	<u>420</u>	76	<u>420</u>
Total		4,816		2,200		2,180

SOURCE: Congressional Budget Office based on data from the Department of Defense.

NOTES: FY = fiscal year; ICBM = intercontinental ballistic missile; SLBM = submarine-launched ballistic missile.

- CBO has also postulated approaches to achieving the 1,700-warhead level in the Moscow Treaty. See Appendix A for detailed descriptions of the force structure for those approaches.
- Under the Administration's plan, warheads are counted as follows: three warheads on each of 350 Minuteman missiles and one warhead on each of the remaining 150 Minuteman missiles; eight warheads on each of the 24 D5 missiles (for a total of 192 warheads on each of the 12 operationally deployed Trident submarines); 16 nuclear bombs on each of the 16 operationally deployed B-2 bombers; and from 12 to 20 cruise missiles on each of the 56 operationally deployed B-52 bombers.
- Under Option 1, warheads are counted as follows: one warhead on each of 500 Minuteman missiles; four warheads on each of the 24 D5 missiles (for a total of 96 warheads on each of the 12 operationally deployed Trident submarines); eight nuclear bombs on each of the 16 operationally deployed B-2 bombers; and about eight cruise missiles on each of the 56 operationally deployed B-52 bombers.
- Under Option 2, warheads are counted as follows: three warheads on each of 150 Minuteman missiles and a single warhead on each of the remaining 200 Minuteman missiles; either four or five warheads on each of the 24 D5 missiles (for a total of 111 warheads on each of the 10 operationally deployed Trident submarines); and about eight cruise missiles on each of the 56 operationally deployed B-52 bombers.
- All B-1 bombers would be permanently converted to a conventional role. Under Option 2, all B-2 bombers would also be permanently converted to a conventional role.

Specific information about those two paths, which would reduce the number of warheads available for immediate use to 2,200, is presented below. Similar paths to reduce the number of available warheads to 1,700, which are discussed in detail in Appendix A, would have almost identical budgetary consequences.

Option 1: Reduce the Number of Warheads to 1,700 or 2,200 Without Retiring Delivery Platforms from the Strategic Inventory. This option illustrates how the Administration could reduce the nuclear arsenal to either 1,700 or 2,200 warheads available for immediate use without retiring any strategic platforms beyond those changes already set out in the 2003-2007 defense program. One way of reducing the nuclear arsenal to 2,200 warheads could involve the following actions:

- Reconfigure the remaining 350 Minuteman missiles to carry one warhead instead of three,
- Deploy only 96 warheads on each of the 12 operational Trident submarines (four warheads for each of the 24 missiles), and
- Remove warheads from military bases where bombers are deployed so that only eight nuclear weapons are available for immediate use on each operational strategic bomber.

CBO estimates that the costs to take those actions would amount to about \$25 million over the 2003-2007 period and \$105 million through 2012 (see Table 3). That estimate includes the \$55 million in costs to meet the Administration's goal of 3,800 warheads by 2007. The details are outlined below.

In another version of this option, the United States could reduce the number of nuclear warheads further, to about 1,700, if it deployed only 72 warheads on each Trident submarine, instead of the 96 warheads indicated above, and converted the B-2 bombers to a conventional non-nuclear role. CBO estimates that the costs to achieve this lower warhead level would amount to \$115 million through 2012. (See Appendix A for details of this estimate, which is labeled Option 1A.)

Missiles. CBO assumes that the Air Force would reconfigure the remaining 350 missiles that currently carry multiple warheads to a single-warhead configuration by replacing the existing bulkheads with new ones. After that, the warheads would need to be prepared for transport to storage sites. The costs to remove the 700 warheads would total about \$25 million over the 2003-2012 period, CBO estimates—about \$15 million to replace the bulkheads and about \$10 million to place the warheads in shipping and storage containers and to transport them to storage facilities.

Submarines. In order to achieve the 2,200-warhead level, CBO assumes that by 2012 the Navy would load only four warheads on each of the 24 D5 missiles on each Trident submarine, for a total of 96 warheads per submarine. In total, 1,152 warheads would need to be removed. The costs to remove missiles from the submarines and warheads from the missiles would be negligible, CBO estimates, because these actions could be done as part of regular maintenance.

Table 3.
Costs or Savings (-) of Various Approaches to Achieving the Moscow Treaty Goal Relative to the Administration's Fiscal Year 2003-2007 Defense Program (In millions of dollars)

	Warhead Removal	Reduced Operations	Canceled Upgrades/Purchases	Total, 2003-2012
Achieve Nuclear Posture Review Goal of 3,800 Warheads by 2007				
ICBMs	15	0	0	15
SLBMs	40	0	0	40
Bombers	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal	55	0	0	55
Option 1: Reduce the Number of Warheads to 2,200 by 2012 Without Retiring Delivery Platforms ^a				
ICBMs	25	0	0	25
SLBMs	40	0	0	40
Bombers	<u>40</u>	<u>0</u>	<u>0</u>	<u>40</u>
Subtotal	105	0	0	105
Option 2: Reduce the Number of Warheads to 2,200 by 2012 by Retiring Some Delivery Platforms ^a				
ICBMs	245	-1,760	-1,000	-2,515
SLBMs	260	-730	-2,150	-2,620
Bombers	<u>50</u>	<u>0</u>	<u>0</u>	<u>50</u>
Subtotal	550	-2,490	-3,150	-5,085

SOURCE: Congressional Budget Office.

NOTE: ICBM = intercontinental ballistic missile; SLBM = submarine-launched ballistic missile.

Numbers may not add up to totals because of rounding.

- a. Costs and savings displayed reflect approaches to reducing current levels of warheads to the Moscow Treaty goal of 2,200 warheads. The costs to remove the warheads for Option 1 and 2 include the \$55 million to achieve the Nuclear Posture Review goal of 3,800 warheads by 2007. CBO estimates that reducing the number of warheads to the 1,700 level would not necessarily result in significant additional costs or savings beyond those estimated for reducing to the 2,200-warhead level. See Appendix A for a breakdown of those costs.

As mentioned above, to comply with the NPR, the Navy would need to purchase additional equipment to maintain the capability to reload eight warheads on each missile at some future time. The costs of that equipment would total about \$40 million over the 2003-2012 period, CBO estimates.

Bombers. CBO assumes that the Air Force would retain for immediate use on its bomber bases only eight nuclear weapons for each of the 16 operational B-2 bombers and 56 operational B-52 bombers to achieve the overall warhead level of 2,200. In that case, 128 nuclear bombs and the warheads on 636 cruise missiles would need to be removed from bomber bases. CBO estimates that the costs to remove the warheads and bombs, to purchase containers to place them in, and to transport them to facilities away from the bases would total about \$40 million in 2012. That estimate does not include any additional costs for shipping and storing the cruise missiles because, as under current Air Force plans, those missiles would be stored at the bases. (If the Air Force chose to store the cruise missiles away from the bomber bases, CBO estimates that shipping and storage costs for those cruise missiles would total about \$5 million in 2012.)

Option 2: Reduce the Number of Warheads to 1,700 or 2,200 by Removing Delivery Platforms from the Strategic Inventory. Another way to reduce the nuclear arsenal to 1,700 or 2,200 warheads would be to remove some warheads and delivery platforms from the strategic inventory. One approach for achieving the 2,200-warhead level could involve the following actions:

- Retire 150 Minuteman missiles,
- Reconfigure 200 of the remaining 350 Minuteman missiles to a single-warhead configuration,
- Retire two of the oldest Trident submarines,
- Deploy only 111 warheads on each of the remaining 10 operational Trident submarines,
- Convert the B-2 bombers to a conventional role, and
- Provide only eight nuclear weapons for use on each operational B-52 bomber.

CBO estimates that the costs to remove the warheads and nuclear weapons from the missiles, submarines, and bombers; transport the warheads and weapons to storage facilities; and retire 150 missiles and two submarines would amount to about \$370 million over the 2003-2007 period and \$550 million through 2012 (see Table 3). However, those costs would be more than offset by the \$5.6 billion in savings over 10 years that would result from forgoing development and procurement of new systems to upgrade the two Trident submarines and 150 Minuteman missiles retired under this option (saving \$3.1 billion) and from reduced operations costs (saving \$2.5 billion). In total, the net savings associated with

this option would be about \$5.1 billion over the 2003-2012 period, CBO estimates. (That estimate is relative to the Administration's fiscal year 2003-2007 defense plan and includes the \$55 million in costs to meet an interim goal of 3,800 warheads by 2007.) The details of this estimate are outlined below.

In a similar manner, the United States could reduce the nuclear warhead levels further, to about 1,700, if it equipped all 350 remaining Minuteman missiles to carry only one warhead and deployed only 96 warheads on each of the 10 operational Trident submarines, instead of the 111 warheads indicated above. CBO estimates that, relative to the Administration's 2003-2007 defense plan, the net savings associated with attaining that level would also total \$5.1 billion over the 2003-2012 period. (See Appendix A for further information about the details of this estimate, which is labeled Option 2A.)

Missiles. CBO assumes that the Air Force would retire the Minuteman wing that is currently composed of 150 single-warhead missiles starting in 2005 and that the retirements would be completed by the end of 2007. The savings from retiring those missiles would total about \$2.5 billion over the 2003-2012 period, CBO estimates. Of that sum, savings of \$1.8 billion would result from reduced operations costs over the 2005-2012 period, or about \$225 million a year. That estimate of savings includes the offsetting costs associated with securing and maintaining the empty silos. An additional \$1 billion in savings over the 2003-2007 period would result from canceling planned propulsion upgrades (about \$450 million) and guidance system upgrades (about \$550 million) for those 150 missiles (see Table 3). (If the upgrades were canceled for the 150 missiles, those missiles could not be reconstituted at some future time.)

However, those savings would be partially offset by one-time costs of about \$230 million for two activities. First, to retire the missiles, the Air Force would have to remove the warheads and guidance sets from the missiles and then dismantle the booster stages. According to the Air Force, it would need to augment squadron personnel with contractor support to accomplish that effort and prepare the components to be moved from the launch site. On the basis of information provided by the Air Force, CBO estimates that the costs to dismantle the missiles would total about \$90 million over the 2005-2007 period. Second, the Air Force would need to transport the warheads, guidance sets, and booster stages to storage sites. CBO assumes that the Air Force would transport the boosters and guidance sets to Hill AFB in Utah and the Utah Test Range and that the Air Force would reimburse the Department of Energy's National Nuclear Security Administration to transport the warheads to DoD storage facilities. The costs for transportation and storage would total about \$140 million over the 2005-2012 period, CBO estimates. Alternatively, the Air Force could choose to destroy the guidance sets. In that case, the Air Force would transport the guidance sets to the Boeing Guidance Repair Center in Ohio for their eventual destruction.

CBO has not included those additional costs in the estimate because the Moscow Treaty does not require that the guidance sets be destroyed.

CBO also assumes that the Air Force would convert an additional 200 missiles with multiple warheads to a single-warhead configuration, removing 400 warheads as a result of that conversion. According to the Air Force, it would need to supplement squadron personnel with contractor support to accomplish that effort. CBO estimates that removing those warheads would cost about \$15 million over the 2004-2007 period, reflecting the costs of replacing the bulkheads (about \$10 million) and transporting the warheads to DoD storage facilities (about \$5 million). The estimate does not include any costs for buying the replacement bulkheads and buying more containers to ship and store the warheads because these items have already been purchased.

Submarines. By retiring two Trident submarines carrying the older C4 missiles when they would otherwise enter an overhaul (one in 2005 and another one the following year), the Navy would remove a total of 288 warheads (144 warheads for each submarine) from operational status.² The savings from retiring the submarines would total about \$730 million in reduced operations costs through 2012, CBO estimates, although those savings would be offset somewhat by one-time costs of about \$220 million to retire the submarines. CBO estimates no additional costs to transport the C4 missiles to DoD storage locations and eventually dispose of them because those missiles would be eliminated under the Administration's defense plan.

Retiring two Trident submarines by 2007 would save an additional \$2.2 billion in planned upgrades and purchases (see Table 3). Not overhauling the two submarines to accommodate the newer D5 missiles would save about \$0.9 billion over the 2003-2007 period, and not buying the 48 D5 missiles that would be deployed on the overhauled submarines would save about \$1.3 billion through 2012.

Alternatively, the Navy could choose to convert those two Trident submarines to a conventional role instead of retiring them. Based on recent experience, the conversion costs, which also include the cost to equip the submarines with 154 Tomahawk missiles, would total about \$2 billion, or roughly \$1 billion for each submarine, CBO estimates.

As in Option 1, CBO assumes an average of two submarines a year would undergo a major overhaul and thus not carry any missiles. Each of the 10 operationally deployed Trident submarines would deploy 111 warheads, or four to five warheads on each submarine's 24 D5 missiles as part of the approach to achieve the treaty's 2,200 level. (CBO

2. Under the Administration's defense plan, these submarines would be upgraded to carry D5 missiles, with a total of 384 warheads on the two vessels.

assumes that 15 of the missiles would carry five W76 warheads and nine missiles would carry four W88 warheads.) In total, CBO calculates that 810 warheads would be removed from service, and the costs to remove them would be negligible.

To maintain the capability to redeploy eight warheads on each missile at some future time, the Navy would need to purchase additional hardware. CBO estimates that the costs of that hardware would total about \$40 million over the 2003-2012 period.

Bombers. Under this option, CBO assumes that the Air Force would convert all 21 B-2 bombers to a conventional role by the end of 2012. In that case, 256 nuclear bombs would be moved from the B-2 bases to storage facilities, at a total cost of about \$10 million in 2012, CBO estimates. But because the aircraft would continue to be used for non-nuclear missions, CBO estimates that there would be no savings from reduced operations.

As in Option 1, CBO assumes that the Air Force would retain for immediate use on its bomber bases only eight nuclear weapons for each of its 56 operational B-52 bombers. CBO estimates that the costs to remove the 636 warheads from service, purchase the containers to place them in, and store nuclear warheads at facilities away from the bases would total about \$40 million in 2012.

Accelerating Warhead Reductions to Achieve Moscow Treaty Goals by 2007

The United States might be able to download warheads from strategic platforms more quickly than envisioned in either Options 1 or 2 described above (or Options 1A or 2A, which are described in Appendix A) to achieve Moscow Treaty goals by 2007. However, both the Air Force and the NNSA have indicated that accelerating the downloading of warheads could be difficult given current plans to retire Peacekeeper missiles and current capacity to transport warheads. Any resources required to overcome those constraints would increase the estimated costs of options that simply download warheads (Options 1 and 1A) and decrease the savings attributed to options that both download warheads and retire delivery platforms (Options 2 and 2A). In the absence of specific plans from the Air Force and the NNSA describing how they might work to achieve this accelerated goal, CBO has no basis for independently estimating those additional resource requirements.

In particular, the Air Force has indicated that current plans to retire the Peacekeeper missiles and upload the warheads from those missiles onto Minuteman missiles at F.E. Warren AFB would probably fully utilize all personnel at that base through 2007. Thus, additional efforts to download warheads from Minuteman missiles to achieve reductions five years earlier than assumed by CBO could prove difficult. The Air Force has also indicated that there may be insufficient space available to temporarily store the warheads while

awaiting removal by the NNSA. That potential shortage of space could require either that DoD build more storage space or that the NNSA expand its fleet of transport vehicles.

Currently, the NNSA has about 25 transport trailers, around 56 armored tractors (for pulling the trailers), and 86 escort vehicles (for security). In addition, about 210 trained federal agents support those transport efforts. The NNSA plans to double those resources by 2008 to support refurbishing the arsenal of nuclear warheads and transporting plutonium from the Hanford Site in Washington and the Idaho Laboratory to the Savannah River Site in South Carolina. Therefore, efforts to meet the Administration's current plan and accelerate the warhead reductions to achieve Moscow Treaty goals by 2007 might require the NNSA to purchase more vehicles and hire more agents. Moreover, the 2,200-warhead goal established by the NPR is predicated on DoD and NNSA completing several other infrastructure initiatives. CBO does not have sufficient information to independently determine if those initiatives could be completed by 2007 or to estimate the costs to accelerate those efforts.

OTHER BUDGETARY ISSUES

CBO has also reviewed:

- The impact on the nuclear weapons production complex of dismantling, instead of storing, weapons removed from service;
- The costs of additional transparency measures associated with the Moscow Treaty, beyond those measures existing under START;
- The costs of converting strategic bombers and submarines to conventional missions but maintaining a ready capability to revert to a strategic role; and
- The savings from lowering the operational status of (taking off high alert) strategic forces scheduled for retirement by 2012.

Impact on the Nuclear Weapons Production Complex of Dismantling Warheads

The NNSA's plans for inspecting and refurbishing warheads and producing tritium and pits are based on maintaining an inventory of nuclear warheads consistent with the U.S. nuclear forces permitted under START and the Administration's fiscal year 2003-2007 defense plan. There might not be any additional costs to maintain those warheads in a condition for speedy

redeployment should they be removed from the missiles and stored at a DoD facility to meet the Moscow Treaty's reduction requirements. Such an approach to implementing the treaty would simply change the locations of warheads, not the total number that must be maintained.

But dismantling, instead of storing, one-half or more of the warheads removed to meet the Moscow Treaty requirements could have substantial costs depending on when that task was performed. According to the NNSA, dismantling by 2012 one-half of the warheads that might be removed would cause a significant increase in workload at its Pantex facility. That increase would place the workload above current projections and beyond the capacity that will be provided once the three currently planned capital construction projects at Pantex are completed in 2007. If, however, completion of dismantlement could be delayed until the 2020-2025 period, the planned capacity at Pantex would probably be sufficient. The NNSA has not provided a specific estimate of the additional capacity that would be needed to complete dismantlement by 2012, and CBO currently lacks sufficient information to independently estimate that needed additional capacity and its cost.

Also according to the NNSA, changes in the nuclear stockpile associated with implementing the Moscow Treaty should have no significant effect on its current plans for pit and tritium production. That conclusion is not surprising because the total number of warheads stored and maintained under the Moscow Treaty would probably not differ significantly from the number maintained under START. The NNSA states that "the modern plutonium pit production facility that is planned to be operational by 2018 will provide a minimum single-shift capacity of 250 pits per year."³ The NNSA states further that "this minimum capacity will be needed to support the stockpile associated with the Moscow Treaty." Similarly, the NNSA states that "there will be no near-term reduction in the immediate demand for tritium." Thus, it is "committed to its plan to begin tritium production in Tennessee Valley Authority reactors in fall 2003, and to complete construction and begin operations of a new tritium extraction facility at the Savannah River Site so that tritium can be delivered to the stockpile in advance of need and maintain the five-year reserve."

CBO currently lacks sufficient information to estimate in detail the effects that dismantling warheads instead of storing and maintaining them might have on needed tritium and plutonium pit production capacities. But if the NNSA's current plans are based on maintaining a START inventory, dismantling some fraction of that inventory ought to imply a concomitant reduction in needed steady-state tritium and pit production capacities. If all or one-half of the warheads removed from operational status under the Moscow Treaty were dismantled, the resulting inventories would be about one-third to two-thirds of the START

3. NNSA's written responses to questions asked by CBO staff on July 22, 2002.

inventory. This implies that the capacity needed to produce pits and tritium might be one-third to two-thirds of currently planned levels. Under those circumstances, the NNSA's current plans for the modern plutonium pit production facility and the tritium extraction facility might need to be reevaluated. Any savings that might be achieved by redesigning these facilities could be offset by the costs to expand the capacity at the Pantex facility to ensure that warheads could be dismantled in a timely manner, however.

Transparency Measures

The Moscow Treaty contains no additional verification provisions beyond those in START because, according to the Administration, U.S. security and the new strategic relationship with Russia do not require them. On the basis of funding levels for START program activities over the 1997-2002 period, CBO estimates that the costs for future transparency measures associated with the Moscow Treaty would total about \$50 million a year, assuming no change in the scope of verification efforts. CBO has no basis for estimating the costs of any additional measures that might be agreed to in the future.

Costs of Converting Bombers and Submarines to Non-Nuclear Missions But Retaining the Option to Restore Nuclear Capability

Apart from its previously announced intent to convert four Trident submarines to a conventional role and to retire the Peacekeeper missiles, the Administration has not yet developed detailed plans for implementing the reductions called for in the Moscow Treaty. In particular, it has announced no plans for converting bombers and submarines to a conventional-only configuration while retaining the option to restore their nuclear capability. The details of such plans would be important in determining both the costs for initial conversion as well as the costs to restore nuclear capability.

For example, as mentioned under Option 2, converting two additional Trident submarines equipped with C4 missiles to the conventional configuration now planned for four of the 18 submarines would cost about \$1 billion per submarine. Those conversions would modify space currently used for other purposes to accommodate special operations forces and would alter the existing missile tubes to accommodate missiles armed with conventional warheads, including Tomahawk cruise missiles. Although those modifications could probably be reversed, CBO has no basis for estimating the costs of doing so.

Converting existing nuclear-armed Trident submarines to a conventional configuration could also be accomplished in other ways. The Administration has requested funds to explore converting the nuclear-armed, intercontinental range Trident ballistic missile to a

version armed with a conventional warhead. Equipping Trident submarines with such a missile might require minimal modifications to the submarines. But again, CBO has no basis for estimating the costs to develop, modify, and test such a missile.

Similarly, the costs of converting bombers to a conventional-only configuration and subsequently restoring their nuclear capability depend on details not yet provided by the Administration. For example, one way that conversion could proceed in accordance with the Moscow Treaty would be to leave the existing physical configurations of the bombers unchanged while halting the training and other activities associated with nuclear missions and removing to remote storage all bomber-delivered nuclear warheads. In that case, costs associated with the subsequent restoration of nuclear capability would probably be negligible. But if the Administration decided to convert all B-52 bombers to a conventional-only configuration by removing the physical and electronic interfaces they now have for carrying nuclear-armed cruise missiles, conversion and restoration costs would probably be significant.

Lowering the Operational Status of Strategic Forces Scheduled for Retirement by 2012

Today, the United States and Russia keep hundreds of nuclear warheads in inventory, ready to launch within minutes. Lowering the operational status—sometimes called “de-alerting”—increases the time that both countries have before they must decide whether to launch missiles in response to an attack. In general, lowering the operational status of strategic offensive forces would involve measures such as keeping the Trident submarines in patrol areas that are not within range of Russian targets, shutting off the switches in Minuteman missile silos, and keeping the strategic bombers off high alert. CBO expects that implementing any of those actions would not significantly change the current deployment schedule of those forces and, therefore, would have a negligible impact on the costs of operations.

APPENDIX A

CBO has also assessed the budgetary impact of reducing the number of warheads to about 1,700 under two scenarios—one without retiring delivery platforms and the other assuming retirement of 150 Minuteman missiles and two Trident submarines. Table A-1 shows the delivery platforms associated with the Administration's plan and these two scenarios. The costs or savings are very similar to those that would result from a reduction to 2,200 warheads. This appendix describes the basis for that estimate.

Option 1A: Reduce the Number of Warheads to about 1,700 Without Retiring Delivery Platforms from the Strategic Inventory. The Administration could reduce the number of warheads to about 1,700 by taking the following actions:

- Reconfigure the remaining 350 Minuteman missiles to a single-warhead configuration,
- Deploy only 72 warheads on each of the 12 operational Trident submarines,
- Convert the B-2 bombers to a conventional role, and
- Remove operational weapons from storage areas at the bomber bases so that only eight nuclear weapons would be available for use on each operational bomber.

CBO estimates that the costs to implement those reductions would total about \$115 million over the 2003-2012 period, including the \$55 million necessary to meet an interim goal of 3,800 warheads by 2007 (see Table A-2). This cost is about \$10 million higher than the cost of Option 1, because it involves the removal of an additional 128 nuclear bombs from B-2 bombers. The costs for removing the additional 288 warheads from the Trident submarines would be negligible.

Missiles. The Air Force would remove 700 warheads by converting the 350 missiles that are currently configured to carry multiple warheads to a single-warhead configuration. The costs to remove those warheads would total about \$25 million over the 2003-2012 period, CBO estimates.

Submarines. Under this scenario, CBO assumes that the Navy would remove six D5 missiles from each Trident submarine, leaving only 18 D5 missiles per submarine, and would deploy four warheads on each of those missiles, for a total of 72 warheads on each submarine. In all, CBO calculates that 1,440 warheads would be removed. The costs to remove the missiles from the submarines and the warheads from the missiles would be negligible, CBO estimates, because those tasks could be done as part of regular maintenance activities.

To maintain the capability to reload eight warheads on each missile at some future time, the Navy would need to purchase additional equipment. CBO estimates that the costs of that equipment would total about \$40 million over the 2003-2012 period.

Bombers. As in Option 2, CBO assumes that the Air Force would convert all 21 B-2 bombers to a non-nuclear role in 2012. Removing 256 nuclear bombs, buying the containers to place them in, and transporting them to storage facilities would cost about \$10 million in 2012, CBO estimates. The Air Force would retain on its bomber bases for immediate use only eight nuclear weapons for each of its 56 operational B-52 bombers. CBO estimates that the costs to remove and store the 636 warheads at facilities away from the bomber bases would total about \$40 million in 2012.

Option 2A: Reduce the Number of Warheads to About 1,700 by Removing Delivery Platforms from the Strategic Inventory. Another way to reduce the number of warheads to 1,700 would be to remove some existing delivery platforms from the strategic inventory. One approach for implementing this option could involve the following actions:

- Retire 150 Minuteman missiles,
- Equip all remaining Minuteman missiles to carry only one warhead instead of three,
- Retire two of the oldest Trident submarines,
- Deploy only 96 warheads on each of the 10 operational Trident submarines,
- Convert the B-2 bombers to a conventional role, and
- Provide only eight nuclear weapons for use on each operational B-52 bomber.

This approach involves the same number of delivery platforms as Option 2, but 450 fewer warheads.

CBO estimates that the costs to remove the warheads and nuclear weapons from the launchers and bomber bases, transport the warheads and weapons to storage facilities, and retire 150 Minuteman missiles and two Trident submarines would total about \$560 million over the 2003-2012 period. Those costs would be more than offset, however, by the significant savings from reduced operations costs and from canceling upgrades and purchases for the submarines and missiles that would be retired under this option. As with Option 2, CBO estimates that the net savings associated with this option would total about \$5.1 billion over 10 years (see Table A-2).

Missiles. CBO assumes that the Air Force would retire 150 Minuteman missiles starting in 2005 (as in Option 2) and that the retirements would be completed by the end of 2007. The net savings from retiring the missiles would total about \$2.5 billion through 2012, CBO estimates. CBO also assumes that the Air Force would convert the remaining

350 Minuteman missiles to a single-warhead configuration. Removing the 700 warheads would cost an estimated \$25 million over the 2003-2012 period.

Submarines. CBO estimates that the net savings from retiring two Trident submarines, one in 2005 and another one the following year, would amount to about \$0.9 billion over the 2003-2007 period and about \$2.6 billion through 2012.⁴

Assuming that the Navy would deploy 96 warheads on each remaining Trident submarine, or four warheads on each of the submarine's 24 D5 missiles, CBO calculates that 960 warheads would be removed. The costs to remove those warheads would be negligible. However, to maintain the capability to redeploy eight warheads on each missile at some future time, the Navy would need to purchase additional equipment, which CBO estimates would cost about \$40 million over the 2003-2012 period.

Bombers. As in Option 2, CBO assumes that the Air Force would convert all 21 B-2 bombers to a conventional role in 2012, resulting in costs of \$10 million in that year to remove 256 bombs, buy the containers to place them in, and transport them to storage facilities. Similarly, the Air Force would provide only eight nuclear weapons for each of its 56 operational B-52 bombers. CBO estimates that the costs to remove the 636 nuclear weapons, purchase containers to place them in, and store them at facilities away from the bomber bases would total about \$40 million in 2012.

4. Under the Administration's defense plan, these submarines would be upgraded to carry D5 missiles, with a total of 384 warheads on the two vessels.

Table A-1.
Comparison of CBO's Options to Achieve the Moscow Treaty Goal of 1,700 Warheads by 2012
(In numbers of delivery platforms and deployed warheads)

Weapon	The Administration's FY 2003-2007 Defense Plan		Option 1A: 1,700 Warheads, No Retirements ^a		Option 2A: 1,700 Warheads, Fewer Platforms ^a	
	Quantity	Warheads ^b	Quantity	Warheads ^c	Quantity	Warheads ^d
ICBMs						
Minuteman III	500	1,200	500	500	350	350
Peacekeeper	0	0	0	0	0	0
SLBMs						
Trident Submarines Carrying C4 Missiles	0	0	0	0	0	0
Trident Submarines Carrying D5 Missiles	14	2,304	14	864	12	960
Bombers						
B-1	e	0	e	0	e	0
B-2	21	256	e	0	e	0
B-52	76	<u>1,056</u>	76	<u>420</u>	76	<u>420</u>
Total		4,816		1,784		1,730

SOURCE: Congressional Budget Office based on data from the Department of Defense.

NOTES: FY = fiscal year; ICBM = intercontinental ballistic missile; SLBM = submarine-launched ballistic missile.

- CBO has also postulated approaches to achieving the 2,200-warhead level in the Moscow Treaty. See Table 2 for detailed descriptions of the force structure for those approaches.
- Under the Administration's plan, warheads are counted as follows: three warheads on each of 350 Minuteman missiles and one warhead on each of the remaining 150 Minuteman missiles; eight warheads on each of the 24 D5 missiles (for a total of 192 warheads on each of the 12 operationally deployed Trident submarines); 16 nuclear bombs on each of the 16 operationally deployed B-2 bombers; and from 12 to 20 cruise missiles on each of the 56 operationally deployed B-52 bombers.
- Under Option 1A, warheads are counted as follows: a single warhead on each of the 500 Minuteman missiles; four warheads on each of the 18 D5 missiles (for a total of 72 warheads on each of the 12 operationally deployed Trident submarines); and about eight cruise missiles on each of the 56 operationally deployed B-52 bombers.
- Under Option 2A, warheads are counted as follows: a single warhead on each of the 350 Minuteman missiles; four warheads on each of the 24 D5 missiles (for a total of 96 warheads on each of the 10 operationally deployed Trident submarines); and about eight cruise missiles on each of the 56 operationally deployed B-52 bombers.
- All B-1 bombers would be permanently converted to a conventional role. Under Options 1A and 2A, all B-2 bombers would be permanently converted to a conventional role.

Table A-2.

Costs and Savings (-) of Alternative Approaches to Achieving the Moscow Treaty Goal Relative to the Administration's Fiscal Year 2003-2007 Defense Program (In millions of dollars)

	Warhead Removal	Reduced Operations	Canceled Upgrades/Purchases	Total, 2003-2012
Option 1A: Reduce the Number of Warheads to 1,700 by 2012 Without Retiring Delivery Platforms ^a				
ICBMs	25	0	0	25
SLBMs	40	0	0	40
Bombers	<u>50</u>	<u>0</u>	<u>0</u>	<u>50</u>
Subtotal	115	0	0	115
Option 2A: Reduce the Number of Warheads to 1,700 by 2012 by Retiring Delivery Platforms ^a				
ICBMs	250	-1,760	-1,000	-2,510
SLBMs	260	-730	-2,150	-2,620
Bombers	<u>50</u>	<u>0</u>	<u>0</u>	<u>50</u>
Subtotal	560	-2,490	-3,150	-5,080

SOURCE: Congressional Budget Office.

NOTE: ICBM = intercontinental ballistic missile; SLBM = submarine-launched ballistic missile.

Numbers may not add up to totals because of rounding.

- a. Costs and savings displayed reflect approaches to reducing current levels of warheads to the Moscow Treaty goal of 1,700 warheads. CBO has also postulated approaches to achieving the 2,200-warhead level in the Moscow Treaty. CBO's estimates for achieving that level are not significantly different in total from the costs displayed above.